

Remarks

Claims 1-22, 25-48 and 51-56 are pending in the application. Claims 1-22, 25 48, 51-56 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. 5293853 (Berger et al) in view of US 4410302 (Chiba et al).

Claim Rejections --- 35 U.S.C. §103(a)

Claims 1-22, 25-48, and 51-56 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. 5293853 (Berger et al) in view of US 4410302 (Chiba et al).

Berger teaches a system for controlling an internal combustion engine. (See, Berger '853 abstract.) Berger's system, as shown in fig. 1, includes a pump 105 which feeds fuel into an internal combustion engine 100. Berger provides no teaching or suggestion of adjusting the pressure of the fuel to the pump using a pressure regulator or any other means. (See, Berger '853, col. 1, line 65 to col. 2, line 52.) Indeed, the Berger system pumps liquid fuel to feed an internal combustion engine, so there would be no need to utilize a pressure regulator to feed the pump.

Chiba et al discloses an electromagnetic fuel pump 1 for liquid fuel with an inlet port 2. (See Chiba, fig. 2 and col. 4. line 32.). Discharge plungers 10 and 16 pump the liquid fuel to an outlet port 30 and thence to the combustion chamber of the engine. (See Chiba, fig. 2 and col. 3. line 65 to col. 4 line 9.) Chiba provides an "air venting device 39" (see col.

5, lines 39-40) on a return path to the fuel supply. The device 39 is “downstream of outlet valve 5” (see col. 5, lines 40-41), which valve 5 is clearly downstream of pump inlet 2. **Thus, air venting device 39 is not between the fuel supply and the pump inlet.** This air venting device 39 reduces the possibility of vapor lock in Chiba’s system by venting gas entrained in the liquid fuel. As Chiba points out (col. 4, lines 50-63), Chiba’s system “would be suitable for handling a noncompressible fluid, but when a compressive gas is handled, the gas would be merely expanded and compressed in the (pump) cylinder.”

By contrast, claim 1 requires in part:

1. A pump system for metering **a flow of a gaseous fuel** from a fuel supply into a pressurized combustion chamber of an external combustion engine, the system comprising:

- a. a pump, the pump having an inlet and an outlet, the inlet connected to the fuel supply **through a pressure regulator** and the outlet connected to the combustion chamber ...(emphasis added).

Because Applicant’s invention meters the flow of a gaseous fuel, the use of a pressure regulator in combination with metered flow would help to eliminate inconsistencies in the gaseous mass flow rate that could be caused by less consistent gas pressures at the pump inlet. Berger does not teach a pump system with a pump connected to the fuel supply through a pressure regulator. Likewise, Chiba does not teach a pressure regulator for a gaseous fuel placed between the fuel supply and the pump inlet. Since both Berger’s and Chiba’s pumps pump liquid fuel to an

engine, there is simply no need to utilize a pressure regulator to feed the pump. Since neither Chiba nor Berger teach a pump inlet connected to the fuel supply through a pressure regulator, a prima facie case of obviousness has not been made for claim 1. Since a prima facie case of obviousness has not been made here, claim 1 is deemed patentable over Berger in view of Chiba.

Claims 2-22 and 25-28, which depend from claim 1, add further limitations to claim 1 and are deemed non-obvious over Berger in view of Chiba for at least the same reasons as for claim 1.

Likewise, claim 29 requires (in part):

29. A method for controlling a flow of a gaseous fuel from a fuel supply into a pressurized combustion chamber of an external combustion engine, the method comprising:

- a. providing a pump, the pump having an inlet and an outlet, the inlet connected to the fuel supply through a pressure regulator and the outlet connected to the combustion chamber;...

Since neither Berger '853 nor Chiba '222 teach or suggest a required limitation of claim 29, i.e., connecting a pump inlet in through a pressure regulator to a fuel supply, the combination of Berger and Chiba cannot render claim 29 obvious. Claims 30-48, and 51-56, which depend from claim 29 and add further limitations, are deemed not obvious over Berger in view of Chiba for at least the same reasons as for claim 29.

Further, for the sake of a clear record, Applicants again respectfully traverse the rejection of claims 1-22, 25-48 and 51-56 for obviousness on

an additional ground. The examiner has not met his burden of factually supporting a prima facie conclusion of obviousness. See, e.g., MPEP 2142. A prima facie showing of obviousness requires *inter alia* “some suggestion or motivation either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.” See MPEP 2143. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant’s disclosure. See In re Vaeck, 947 F.2d 488 (Fed. Cir. 1991). Here, no showing has been made that a skilled worker would be motivated to employ the specific types of pumps and control methods disclosed in Applicants’ application and claimed in claims 1-22, 25-48 and 51-56 to achieve precise control of the fuel flow. The statement that “it is well known in the art that different types of pumps can be used ... for the purpose of achieving appropriate work output.” is not sufficient to establish prima facie obviousness. See MPEP 2143.01.

In accordance with 37 C.F.R. 1.104(c)(2) and MPEP 2144.03C Applicants again request that in the next office action the examiner provide documentary evidence that the specific combinations of pumps, signals, air/fuel ratio, filters, etc. in the precisely claimed configuration are well-known, or known at all, to achieve precise control of fuel flow. Alternatively, the rejections for obviousness of 1-22, 25-48 and 51-56 must be withdrawn. The Examiner should note that Applicants’ specification shows advantages of claimed combinations of pump type,

pump construction, control waveform, etc. for achieving precision control of fuel flow. Imprecision of the work output of the pump is overcome by the combinations of elements taught by Applicants' specification and these combinations are not well-known in the art.

Since a prima facie case of obviousness has not been established by the office action, claims 1-22, 25-48 and 51-56 are deemed patentable.

The Commissioner is hereby authorized to charge any deficiency in the fees filed, asserted to be filed or which should have been filed herewith to our Deposit Account No. 19-4972. Applicants request reconsideration of the rejected claims and a notice of allowance. The Examiner is requested to telephone the undersigned if any matters remain outstanding so that they may be resolved expeditiously.

Respectfully submitted,

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